

Appl. No. : 09/933,580
Filed : August 20, 2001

REMARKS

As requested in the facsimile from the Examiner dated November 30, enclosed are copies of the four references from the IDS filed on January 22, 2002.

Also, applicants have carefully considered the pending rejections but respectfully assert that the pending claims are allowable over the Examiner's rejections for at least the reasons set forth below.

Rejections under § 112

The Examiner has rejected Claims 13-16 under 35 U.S.C. § 112, ¶ 1 for failing to comply with the enablement requirement. The Examiner states that it is unclear how the binding is ascertained, but those of skill in the art currently use many different commercially available software packages to computationally determine binding affinities and characterize them numerically. One such example is provided by the DOCK algorithm referred to in the Briem reference cited by the Examiner. What is known need not be described in detail. Thus, the description of determining affinities on page 7, lines 13-25 is enabling to one of ordinary skill in the art. The definition of the vectors of Figure 5 is provided on page 8, lines 7-11. Because one of skill in the art knows how to create numerical affinity classifications, and page 8 defines the creation of a vector as a series of such numerical classifications, the creation of the interaction fingerprint of Claim 13 is enabled.

Page 8, lines 14 to 24 describe an overlap computation which involves computing a normalized scalar product of two vectors. This is a well known mathematical procedure which can be used on any pair numeric strings, and can be thought of as determining the extent to which two vectors "point" in the same direction. Computing an overlap of two fingerprint vectors is therefore enabled, and as described on page 8, this computation provides a numerical value indicating the degree to which two fingerprints are the same. Therefore, the comparing step of Claim 13 is enabled.

The Examiner's final objection seems to be that there is no indication in the specification regarding how a numerical value of fingerprint overlap provides enough information to a researcher to come to a conclusion about a protein's suitability for pharmaceutical intervention.

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However, one of skill in the art is able to use the invention based on the specification as filed without any prior knowledge on this issue. For example, antibiotics typically work by interfering with some protein produced by the microorganism that is required for development, function, or metabolism of the microorganism. When operation of this protein is interfered with because a drug molecule has bound to it, the organism dies. As resistant strains of microorganisms develop, new antibiotics targeting other microorganism proteins must be developed. To do this, the proteins for the microorganism may be analyzed, and a set of candidate target proteins are determined based on their function in the organism. To minimize side effects, it is preferable for the target microorganism protein to be as different as possible from human proteins so that taking the antibiotic does not interfere with human cellular function. The invention can be used to determine the similarity between each of the potential target microorganism proteins and proteins encoded by the human genome. Target proteins that are the least similar are the best candidates for pharmaceutical intervention. Other examples are also provided by the specification where no prior knowledge is necessary regarding how a single fingerprint or a single fingerprint pair overlap is biologically significant. As set forth above and in the specification at pages 9-10, a conclusion can be drawn that a particular microorganism protein is a good antibiotic target based solely on comparisons of multiple fingerprint overlaps. No knowledge of the significance of each individual overlap is necessary in any way. This is in fact one advantageous feature of the invention.

Thus, identifying a target protein for pharmaceutical intervention based at least in part on the comparing step of Claim 13 is enabled.

The Applicant wishes to point out that the invention is useful in the early stages of drug discovery. At these stages, it is typically not possible to know the true biological effects and functions of the proteins and candidate drug molecules being studied. This knowledge is developed later in bench testing, animal models, and eventually human clinical trials. However, at this early stage, it is extremely valuable to be able to rank candidate compounds and proteins as being more or less promising candidates relative to each other. This can be done with fingerprint comparisons across a set of molecules as taught in the present specification even when the biological significance of individual fingerprints is not known. It is therefore

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unnecessary to know or describe the biological significance of any one computed overlap to enable valuable use of the invention in the drug discovery process.

CONCLUSION


The Applicants respectfully submit that they have addressed all the Examiner's concerns regarding Claims 13-15 by the remarks above. As such, the Applicants request that Claims 13-15 be allowed.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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